

METALLURGIA - INDEX TO VOLUME 59

JANUARY - DECEMBER 1992

A	Activated carbon-strong growth led by environmental concern				
	Advanced computer-controlled furnace plant boosts bearing production	303			
	Advanced joining techniques boost advanced materials application	250			
	Al Mg Li Forgings for aerospace	289			
	Aluminium alloys, high-performance in aerospace roles	399			
	Aluminium-based MMC extrusion	238			
	Analysing carbon and sulphur content	410			
	Automatic electric upsetting	431			
	Automatic hardening and quenching line	404			
	Automation management	87			
		364			
B	BFIA technical conference, 1992	424			
	Billet heater spotlighted	93			
	British Steel, formability R&D at	305			
	British Steel, inspection and measurement in	369			
	Bulk cold forming presses	403			
	Burners and recuperators, new	248			
C	Calibration and inspection, the black arts of	209			
	Camera copes with high light levels	212			
	Canop Foundry, case study	305			
	Carburising, low pressure	179			
	Casting, high integrity thin-wall - major advance for automotive industry	27			
	Ceramic core, precision production	30			
	Ceramic shells, new generation binders	36			
	Ceramics, microwave firing of	416			
	China's first aluminium coating line	98			
	Closed die forging operations, new press designs	57			
	Cold massive forming of wire and bar sections - latest trends and developments	404			
	Computer modelling of zero gas turbine disc forgings	56			
	Condition monitoring under award for	387			
	CONFORM for PM processing	211			
	Continuous heat-treatment, forgings, castings, wire products	136			
	Contract heat-treatment, the way forward	97			
	Controlled atmospheres for thermochemical surface engineering	329			
	Customer liaison - the key to correct heat-treatment specification	107			
		114			
E	EC machinery safety laws, meeting the challenge of	400			
	Electric melting, seminar provides update	69			
	Electricity, efficiency and the EPA	304			
	Electro Technology Demonstration Centre offers test and research facilities	65			
	Electroheat techniques for heat-treatment and surface finishing	72			
	Energy savings highlighted in metal industry projects	256			
	Engineering ceramics - new generation	290			
	Environmental control in the metals industry	299			
	Equipment, materials and techniques in focus	415			
	Eurofleur 92 - looking ahead to French Furnaces Show	120			
	Extruded radiant/protective tubes, advances in	255			
F	Fatigue testing of crankshafts at Shardlow	53			
	Forge and foundry expertise displayed for turbine manufacture	50			
	Forged steel components, vital importance of	328			
	Forging - around the industry	395			
	Forging manipulator boosts efficiency	296			
	Forging tools, preheating news	335			
	Friction extrusion of powder and machine wear	335			
	Friction surfacing of powder and machine wear	335			
	Furnace combustion, shows potential for aerospace uses	241			
	Furnace sector, no immediate upturn	179			
	Furnace survey service	141			
	Furnaces Asia '92 - Demand fired up for Far East furnaces	365			
		281			
	Furnaces Asia '92 - First US brass mill for 50 years	288			
	Furnaces Asia '92 - Furnace technology	283			
	Furnaces Asia '92 - Improved technology to control heating and melting	280			
	Furnaces Asia '92 - Show preview	273			
	Furnaces, new, extend aerospace capabilities	330			
G	Gas-fired stainless strip processing - plc controlled	252			
	GEM 1991 Awards highlighted	148			
H	Heat-treat subcontractor invests £3.4 million	245			
	Heat-treat - technology in action	182			
	Heat-treatment company, winning single source status	118			
	Heat-treatment in non-cryogenically produced nitrogen	110			
	Heat-treatment investment keeps steel company at forefront	89			
	Heat-treatment, computers in	363			
	Heat-treatment, continuous investment provides world-class	321			
	Heat-treatment, process management system for HFO or gas for regenerative combustion?	367			
	High temperature pusher tube furnace	253			
	Highly contaminated aluminium now recyclable	182			
	HIP Quenching in 2000 bar argon gas	300			
	Hot slab measurement for high-quality shaped parts	237			
	Hot isothermal forging for high-quality shaped parts	296			
	Hydraulic process for titanium SPF	371			
	Hydroforming process 'blow moulds' steel	241			
		148			
I	ICFG's Plenary Meeting	396			
	Induction heating, hot and warm forming	58			
	Industrial Energy Efficiency Centre - electrical process proving ground	259			
	Infrared installation lowers running costs of Ford	90			
	Inspection shows massive savings for paint curing	70			
	Inspection and measurement - major production losses prevented	210			
	Italian forgers seek new markets	141			
L	Line scanning infrared thermometer	366			
	Liquid media and processes in action	417			
	Low-frequency sorting bridge equipment detects ferrous material	341			
	Lydmet, new furnaces boost capacity	35			
M	Magnesium, the case for	414			
	Masucco - ring rolling specialist	145			
	Material identification, positive on-site	342			
	Materials Testing '92 - around the industry	409			
	Materials Testing '92 - What's in store	75			
	Measurement - a key role in metals engineering	372			
	Mechanically alloyed material features in helicopter weight reduction programme	242			
	Melting and Holding - save energy and money	157			
	Melting and Holding - technologies in action	159			
	Metal injection moulding - current status and future prospects	131			
	Metal injection mouldings, technical advances, applications and business outlook	7			
	Metal powder, particle sizing of	390			
	Metal shaping group profiled	372			
	Metal thickness measurement	373			
	Microscopes, long range	10			
	MIM - basic attractions	138			
	MIM offers design and process benefits	94			
	Multi-zone vacuum tube furnace installed	261			
N	Near-Net-Shape forging of high temperature alloys	60			
	New plant realises energy savings	102			
	New technology controls old furnace	371			
O	Optical probes in non-contact measurement	293			
	Orbital cold forming racks for variable ratio steering gear	371			
P	Panke, S, dedicated CAE package installed by	396			
	Plant investment boosts pipe forming operation	408			
	PM highlighted in superalloy gas turbine blade project	336			
	PM Manufacturing technology, new push in	12			
	Powder forged parts for application in gear boxes	11			
	Powder metallurgy - around the industry	337			
	Powder metallurgy techniques, new routes to perfecting	333			
	Precision rotary swaging	403			
	Precision surface inspection	373			
	Presintered preforms developed	139			
Q	Quality testing reveals manufacturing flaws	342			
R	Rapid prototyping to become major manufacturing tool	54			
	Refractories - around the industry	163			
	Refractories and insulations, advances in	162			
	Remote control system for furnace doors	366			
	Rovetto - non-ferrous forging equipment	144			
S	Semi-solid process, forges future markets	47			
	Silicon bronze - versatile, durable and easy to form	407			
	Specialist forging company, successful year	327			
	SPF aluminium, new market promise for	412			
	Spray deposition - a new alternative	334			
	Steel heat-treatments using new processes	249			
	Steel sector backdrop, forgings production spotlighted	388			
	Steel technology developments boost aerospace application	233			
	Stress analysis for aircraft disaster investigations	428			
	Subcontract testing - basic requirements	116			
	Superalloy forming, machines for	392			
	Superalloys for gas turbine castings	50			
	Superplastic forming sheet alloy developed	406			
T	Technologie Alto Vuoto	142			
	Temperature measurement costs reduced	364			
	Temperature sensing in melting and holding furnaces	100			
	Testing equipment and techniques in action	344			
	Testing, of metals, advanced	427			
	Thermography - fast and reliable	370			
	Titanium alloys and forming developments	413			
	Titanium alloys, new	399			
	Titanium MMCs - aerospace production facility planned	236			
	Transparent furnace for materials R&D	113			
U	UK meet for international diecasting group	33			
	Ultrasonic steel inspection	372			
	Ultrasonic steel inspection system	429			
V	Vacuum furnace technology - practical solutions for PM	137			
	Vacuum heat-treater specifies advanced instrumentation	103			
	Vacuum induction brazing, advances	190			
	Vacuum melting - 3-tonne installation commissioned	28			
	Vacuum metallising technology supports growth market	186			
	Vacuum sintering developments	330			
	Vacuum technology - around the industry	194			
	Valmex, cold forge press at	395			
	Variable speeds drives show advantages for steel soaking pits	330			
	VIM plant installed for aerospace superalloys	240			
W	Whisker reinforced ceramic matrix composites	292			

Supplements 1992	
April 1992 issue	
Seco/Warwick Corporation - company profile	
May 1992 issue	
Quality Testing Supplement (code QT)	
June 1992 issue	
Annual Forging Supplement and Buyers Guide (code F)	
October 1992 issue	
Contract Heat Treatment Supplement (code CHT)	
Furnaces Asia '92 Catalogue (code FA)	
LOI Group - company profile	
December 1992 issue	
Annual Furnaces Supplement & Buyers Guide (code FUS)	
General Vacuum Equipment - company profile	

A	Acoustic emission testing	QT9
B	Buyers Guide, Furnace Equipment	FUS23
C	Combustion, advanced, boosts salt bath operations	FUS18
	Commercial heat-treatment in the 90s	CHT4
	Combustion, advanced, boosts salt bath operation	FUS18

AUTHOR INDEX	
Aczel, J	100
Andrews, S	F4
Atkins, R	215
Bailey, R M	116
Baker, M J	102
Bayless, R	328
Bergler-Bartsch, K	57
Bloor, I K	QT14
Bonner, B B	100
Bradon, J	416
Brasenall, M	110
Brennan, D F	102
Brown, I	FUS1
Cooper, M R	114
Dann, H	427, FUS1
Eltch, U	11
Elliott, T L	CHT4
Excell, M	407
Fennell, J	10
Fink, C W	F13
Furness, C P	364
Garg, D	110
Hill, T A	363
Holder, R	372
Kirkland, P	11
Knox, T J	369
Mabbutt, D J	249
Munshere, H	139
Newbert, H	11
O'Reilly, K	416
Owen, A J	334
Paling, I H	327
Plumb, S A	CHT1
Pratt, A	329
Reason, P	427
Robinson, N A	341
Rowbotham, S	342
Scott-Coombes, M	AM1
Smith, B	371
Thomas, P	118
Trew, C	209
Vandermeulen, M	110
Westhoff, P	57
Whittaker, D	7 & 131

Supplements 1992	
April 1992 issue	
Seco/Warwick Corporation - company profile	
May 1992 issue	
Quality Testing Supplement (code QT)	
June 1992 issue	
Annual Forging Supplement and Buyers Guide (code F)	
October 1992 issue	
Contract Heat Treatment Supplement (code CHT)	
Furnaces Asia '92 Catalogue (code FA)	
LOI Group - company profile	
December 1992 issue	
Annual Furnaces Supplement & Buyers Guide (code FUS)	
General Vacuum Equipment - company profile	

SUPPLEMENT INDEX	
Contract Heat Treatment Association - buyers guide to service capabilities	CHT13-16
Cranking up new forging business - joint venture starts operations in the USA	F1
E	
Energy efficiency for thermal processing of metals	FUS1
Equipment, technology and services review	CH6-10
F	
Forging equipment - buyers guide	F18-28
Furnace Association seeks wider appeal	FUS5
Furnaces brazing - the forgotten process	FUS10
Furnaces Asia '92 - show review	CHT3
Furnaces Supplement - Around the industry	FUS10
Furnaces Supplement - Buyers Guide	FUS20
H	
Hydraulic test machines	QT13
I	
Index to 'Metallurgia' January - December 1992	FUS56
K	
Kiln roof construction, new refractory concept	FUS8
M	
Material evaluation under extreme environmental conditions	QT14
N	
NDT and QA - a range of new developments	QT1
Nitrocar - cleaner surface engineering	CHT1
P	
Portable hardness testing	QT13
R	
Resounding success for cold forging conference	F17
S	
Salmon farming to soft drink dispersing	QT6
Strip furnaces, continuous, improve quality and costs	FUS17
Success with fluidised bed	F13
Survival in the world markets	F13
U	
Useful rise in imports of forging equipment in Europe	F4
V	
Vacuum induction melting plants show high quality and productivity	FUS12
X	
XRF analysis	QT9

METALLURGIA - INDEX TO VOLUME 59

JANUARY - DECEMBER 1992

A	Activated carbon-strong growth led by environmental concern				
	Advanced computer-controlled furnace plant boosts bearing production	303			
	Advanced joining techniques boost advanced materials application	250			
	Al Mg Li Forgings for aerospace	289			
	Aluminium alloys, high-performance in aerospace roles	399			
	Aluminium-based MMC extrusion	238			
	Analysing carbon and sulphur content	410			
	Automatic electric upsetting	431			
	Automatic hardening and quenching line	404			
	Automation management	87			
		364			
B	BFIA technical conference, 1992	424			
	Billet heater spotlighted	93			
	British Steel, formability R&D at	305			
	British Steel, inspection and measurement in	369			
	Bulk cold forming presses	403			
	Burners and recuperators, new	248			
C	Calibration and inspection, the black arts of	209			
	Camera copes with high light levels	212			
	Canop Foundry, case study	305			
	Carburising, low pressure	179			
	Casting, high integrity thin-wall - major advance for automotive industry	27			
	Ceramic core, precision production	30			
	Ceramic shells, new generation binders	36			
	Ceramics, microwave firing of	416			
	China's first aluminium coating line	98			
	Closed die forging operations, new press designs	57			
	Cold massive forming of wire and bar sections - latest trends and developments	404			
	Computer modelling of zero gas turbine disc forgings	387			
	Condition monitoring award for	211			
	CONFORM for PM processing	136			
	Continuous heat-treatment, forgings, castings, wire products	97			
	Contract heat-treatment, the way forward	329			
	Controlled atmospheres for thermochemical surface engineering	107			
	Customer liaison - the key to correct heat-treatment specification	114			
E	EC machinery safety laws, meeting the challenge of	400			
	Electric melting, seminar provides update	69			
	Electricity, efficiency and the EPA	304			
	Electro Technology Demonstration Centre offers test and research facilities	65			
	Electroheat techniques for heat-treatment and surface finishing	72			
	Energy savings highlighted in metal industry projects	256			
	Engineering ceramics - new generation	290			
	Environmental control in the metals industry	299			
	Equipment, materials and techniques in focus	415			
	Eurofleur 92 - looking ahead to French Furnaces Show	120			
	Extruded radiant/protective tubes, advances in	255			
F	Fatigue testing of crankshafts at Shardlow	53			
	Forge and foundry expertise displayed for turbine manufacture	50			
	Forged steel components, vital importance of	328			
	Forging - around the industry	395			
	Forging manipulator boosts efficiency	296			
	Forging tools, preheating news	335			
	Friction extrusion of powder and machine wear	335			
	Friction surfacing of powder and machine wear	335			
	Furnace combustion, shows potential for aerospace uses	241			
	Furnace sector, no immediate upturn	179			
	Furnace survey service	141			
	Furnaces Asia '92 - Demand fired up for Far East furnaces	365			
		281			
	Furnaces Asia '92 - First US brass mill for 50 years	288			
	Furnaces Asia '92 - Furnace technology	283			
	Furnaces Asia '92 - Improved technology to control heating and melting	280			
	Furnaces Asia '92 - Show preview	273			
	Furnaces, new, extend aerospace capabilities	330			
G	Gas-fired stainless strip processing - plc controlled	252			
	GEM 1991 Awards highlighted	148			
H	Heat-treat subcontractor invests £3.4 million	245			
	Heat-treat - technology in action	182			
	Heat-treatment company, winning single source status	118			
	Heat-treatment in non-cryogenically produced nitrogen	110			
	Heat-treatment investment keeps steel company at forefront	89			
	Heat-treatment, computers in	363			
	Heat-treatment, continuous investment provides world-class	321			
	Heat-treatment, process management system for HFO or gas for regenerative combustion?	367			
	High temperature pusher tube furnace	253			
	Highly contaminated aluminium now recyclable	182			
	HIP Quenching in 2000 bar argon gas	300			
	Hot slab measurement for high-quality shaped parts	237			
	Hot isothermal forging for high-quality shaped parts	296			
	Hydraulic presses for titanium SPF	371			
	Hydroforming process 'blow moulds' steel	241			
		148			
I	ICFG's Plenary Meeting	396			
	Induction heating, hot and warm forming	58			
	Industrial Energy Efficiency Centre - electrical process proving ground	259			
	Infrared installation lowers running costs of Ford	90			
	Inspection shows massive savings for paint curing	70			
	Inspection and measurement - major production losses prevented	210			
	Italian forgers seek new markets	141			
L	Line scanning infrared thermometer	366			
	Liquid media and processes in action	417			
	Low-frequency sorting bridge equipment detects ferrous material	341			
	Lydmet, new furnaces boost capacity	35			
M	Magnesium, the case for	414			
	Masucco - ring rolling specialist	145			
	Material identification, positive on-site	342			
	Materials Testing '92 - around the industry	409			
	Materials Testing '92 - What's in store	75			
	Measurement - a key role in metals engineering	372			
	Mechanically alloyed material features in helicopter weight reduction programme	242			
	Melting and Holding - save energy and money	157			
	Melting and Holding - technologies in action	159			
	Metal injection moulding - current status and future prospects	131			
	Metal injection mouldings, technical advances, applications and business outlook	7			
	Metal powder, particle sizing of	390			
	Metal shaping group profiled	372			
	Metal thickness measurement	373			
	Microscopes, long range	10			
	MIM - basic attractions	138			
	MIM offers design and process benefits	94			
	Multi-zone vacuum tube furnace installed	261			
N	Near-Net-Shape forging of high temperature alloys	60			
	New plant realises energy savings	102			
	New technology controls old furnace	371			
O	Optical probes in non-contact measurement	293			
	Orbital cold forming racks for variable ratio steering gear	371			
P	Panke, S, dedicated CAE package installed by	396			
	Plant investment boosts pipe forming operation	408			
	PM highlighted in superalloy gas turbine blade project	336			
	PM Manufacturing technology, new push in	12			
	Powder forged parts for application in gear boxes	11			
	Powder metallurgy - around the industry	337			
	Powder metallurgy techniques, new routes to perfecting	333			
	Precision rotary swaging	403			
	Precision surface inspection	373			
	Presintered preforms developed	139			
Q	Quality testing reveals manufacturing flaws	342			
R	Rapid prototyping to become major manufacturing tool	54			
	Refractories - around the industry	163			
	Refractories and insulations, advances in	162			
	Remote control system for furnace doors	366			
	Rovetto - non-ferrous forging equipment	144			
S	Semi-solid process, forges future markets	47			
	Silicon bronze - versatile, durable and easy to form	407			
	Specialist forging company, successful year	327			
	SPF aluminium, new market promise for	412			
	Spray deposition - a new alternative	334			
	Steel heat-treatments using new processes	249			
	Steel sector backdrop, forgings production spotlighted	388			
	Steel technology developments boost aerospace application	233			
	Stress analysis for aircraft disaster investigations	428			
	Subcontract testing - basic requirements	116			
	Superalloy forming, machines for	392			
	Superalloys for gas turbine castings	50			
	Superplastic forming sheet alloy developed	406			
T	Technologie Alto Vuoto	142			
	Temperature measurement costs reduced	364			
	Temperature sensing in melting and holding furnaces	100			
	Testing equipment and techniques in action	344			
	Testing, of metals, advanced	427			
	Thermography - fast and reliable	370			
	Titanium alloys and forming developments	413			
	Titanium alloys, new	399			
	Titanium MMCs - aerospace production facility planned	236			
	Transparent furnace for materials R&D	113			
U	UK meet for international diecasting group	33			
	Ultrasonic steel inspection	372			
	Ultrasonic steel inspection system	429			
V	Vacuum furnace technology - practical solutions for PM	137			
	Vacuum heat-treater specifies advanced instrumentation	103			
	Vacuum induction brazing, advances	190			
	Vacuum melting - 3-tonne installation commissioned	28			
	Vacuum metallising technology supports growth market	186			
	Vacuum sintering developments	330			
	Vacuum technology - around the industry	194			
	Valmex, cold forge press at	395			
	Variable speeds drives show advantages for steel soaking pits	330			
	VIM plant installed for aerospace superalloys	240			
W	Whisker reinforced ceramic matrix composites	292			

Supplements 1992	
April 1992 issue	
Seco/Warwick Corporation - company profile	
May 1992 issue	
Quality Testing Supplement (code QT)	
June 1992 issue	
Annual Forging Supplement and Buyers Guide (code F)	
October 1992 issue	
Contract Heat Treatment Supplement (code CHT)	
Furnaces Asia '92 Catalogue (code FA)	
LOI Group - company profile	
December 1992 issue	
Annual Furnaces Supplement & Buyers Guide (code FUS)	
General Vacuum Equipment - company profile	

A	Acoustic emission testing	QT9
B	Buyers Guide, Furnace Equipment	FUS23
C	Combustion, advanced, boosts salt bath operations	FUS18
	Commercial heat-treatment in the 90s	CHT4
	Combustion, advanced, boosts salt bath operation	FUS18

AUTHOR INDEX	
Acel, J	100
Andrews, S	F4
Atkins, R	215
Bailey, R M	116
Baker, M J	102
Bayless, R	328
Bergler-Bartsch, K	57
Bloor, I K	QT14
Bonner, B B	100
Bradon, J	416
Brasenall, M	110
Brennan, D F	102
Brown, I	FUS1
Cooper, M R	114
Dann, H	427, FUS1
Eltch, U	11
Elliott, T L	CHT4
Excell, M	407
Fennell, J	10
Fink, C W	F13
Furness, C P	364
Garg, D	110
Hill, T A	363
Holder, R	372
Kirkland, P	11
Knox, T J	369
Mabbutt, D J	249
Munshere, H	139
Newbert, H	11
O'Reilly, K	416
Owen, A J	334
Paling, I H	327
Plumb, S A	CHT1
Pratt, A	329
Reason, P	427
Robinson, N A	341
Rowbotham, S	342
Scott-Coombes, M	AM1
Smith, B	371
Thomas, P	118
Trew, C	209
Vandermeulen, M	110
Westhoff, P	57
Whittaker, D	7 & 131

SUPPLEMENT INDEX	
Contract Heat Treatment Association - buyers guide to service capabilities	CHT13-16
Cranking up new forging business - joint venture starts operations in the USA	F1
E	Energy efficiency for thermal processing of metals
Equipment, technology and services review	FUS1
F	Forging equipment - buyers guide
Furnace Association seeks wider appeal	F18-28
Furnaces Asia '92 - the forgotten process	FUS5
Furnaces Asia '92 - show review	CHT3
Furnaces Supplement - Around the industry	FUS10
Furnaces Supplement - Buyers Guide	FUS20
H	Hydraulic test machines
Index to 'Metallurgia' January - December 1992	QT13
I	Kiln roof construction, new refractory concept
K	Kiln roof construction, new refractory concept
M	Material evaluation under extreme environmental conditions
QT14	XRF analysis
N	NDT and QA - a range of new developments
Nitrocalc - cleaner surface engineering	QT1
P	Portable hardness testing
R	Resounding success for cold forging conference
S	Salmon farming to soft drink dispersing
Strip furnaces, continuous, improve quality and costs	QT6
Success with fluidised bed	FUS17
Survival in the world markets	F13
U	Useful rise in imports of forging equipment in Europe
V	Vacuum induction melting plants show high quality and productivity
X	XRF analysis
QT9	

